APPENDIX J

WATER SUPPLY ASSESSMENT

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DRAFT
Water Supply Assessment
For

City of Sunnyvale
Industrial to Residential Conversion

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City of Sunnyvale

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INTRODUCTION

Background

The City of Sunnyvale intends to rezone 129 acres located between N. Wolfe and Lawrence Expressway from Industrial use to Residential use. The location of the property is shown on **Figure 1,** a regional setting and **Figure 2**, a local setting. An Environmental Impact Report (EIR) is currently being prepared for the rezoning and development of this Industrial to Residential project (ITR).

There are three proposed scenarios for development. **Figures 3** through **5** show the proposed development plans for Scenarios 1 through 3 respectively. **Table 3** summarizes the development scenarios. **Figure 3** shows the development for Scenario 1, the preferred alternative. This scenario includes over 10 acres of park land, a mix of town homes and apartments, and a small area of retail use. Scenario 2 includes fewer residential units on the property and Scenario 3 involves a similar density as Scenario 1, but only on 85 acres or 65 percent of the property.

The California Water Code section 10910 (also termed Senate Bill 610 or SB610) requires that a water supply assessment be provided to cities and counties for a project that is subject to the California Environmental Quality Act (CEQA). The cities and counties are mandated to identify the public water system that might provide water supply to the project and then to request a water supply assessment. The water supply assessment documents the sources of water supply, quantifies water demands, evaluates drought impacts, and provides a comparison of water supply and demand that is the basis for an assessment of water supply sufficiency. If the assessment concludes that water supplies are or will be insufficient, then the public water system must provide plans for acquiring the additional water. If the lead agency decides that the water supply is insufficient, the lead agency may still approve the project, but must include that determination in its findings for the project and must include substantial evidence in the record to support its approval of the project.

Purpose

The purpose of this Water Supply Assessment is to document the City of Sunnyvale's existing and future water supplies for its service area and compare them to the area's build-out water demands including the proposed project. This comparison, conducted for both normal and drought conditions, is the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code section 10910 (Senate Bill 610).

Figure 1 shows the location of the Sunnyvale service area and the proposed development site with reference to the Santa Clara Valley groundwater subbasin boundaries. **Figure 2** shows the project area with reference to the city limits, water supply sources, and major roads.

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WATER DEMAND

This section summarizes water demands for the study area. The first part describes the factors affecting total water demand, including climate, population, and the mix of customer types, such as residential, commercial, and landscaping. The second part documents water demands not only under normal climatic conditions, but also during drought.

Climate

Climate has a significant influence on water demand on a seasonal and annual basis. This influence increases with the portion of water demand for outside uses, primarily landscaping or agricultural irrigation. With regard to seasonal influences, rainfall in the winter months fulfills much of the water demand for irrigation, while lack of rainfall during the warm, high-evapotranspiration summer season results in peak monthly water demands that are nearly three times that of winter. With regard to annual influences, the local climate is subject to recurring droughts during which water demands would tend to increase, barring water conservation measures.

Table 1 summarizes representative climate data for the study area, including average monthly precipitation, temperature, and evapotranspiration (ETO). The City of Sunnyvale has a semi-arid, Mediterranean climate, characterized by warm dry summers and cool winters. As indicated in the table, precipitation occurs primarily in the winter months (November through April) and averages 14.3 inches per year.

Figure 6 is a chart of annual rainfall from calendar year 1949 through 2001 for the NOAA San Jose station. As illustrated in **Figure 6**, the south bay is subject to wide variations in annual precipitation; an extreme single-year drought occurred in 1976, when annual rainfall amounted to only 7.2 inches, or about one-half of the average rainfall. A severe, prolonged drought occurred in the late 1980s and early 1990s; over a four-year period, annual rainfall averaged only two-thirds of the annual average. For the purposes of this report, all years are given as calendar year unless otherwise stated.

Population

In general as population increases, so does water demand. The population increase due to the project depends on which land use scenario is selected for development. **Table 2** shows the population increases based on each of the three scenarios, while **Table 3** provides a summary of the scenarios, including the number of residential units used to estimate the increase in population. As shown in **Table 2**, the greatest population increase would occur in Scenario 1 and involves a 2.6 percent increase from the current Sunnyvale area population, as estimated by

Association of Bay Area Governments (ABAG). For comparison the ABAG projections for the City of Sunnyvale are also shown on **Table 2**. In Scenario 1, the 2015 population for the City of Sunnyvale including the project would be 140,105 people, only 105 people more (or .075 percent) than the ABAG 2015 estimate. It should be noted that the ABAG projections include the City's jurisdictional boundary and Sphere of Influence .

Water Use Sectors and Water Demand

Figure 7 shows the estimated water demand by customer type for each year from 1988 to 2004. Demand data for each customer type was not available for 1988 to 1999; accordingly, the volume of demand for each customer type is based on the observed distribution for fiscal year 2000-2001. From 2000 to 2004, the demand by customer type is only available by fiscal year. An average of the two fiscal years was used to estimate the usage over the calendar year. For example, for 2003 the usage values for fiscal years 2002-2003 and 2003-2004 were averaged. The distribution of demand over customer type has remained relatively consistent over the past five years and most likely varied little from 1988. However, during drought conditions the distribution may have changed in response to conservation measures. For example, during the 1988-1992 drought, irrigation may have been reduced by as much as 25 percent whereas residential demand may have been reduced by only 15 percent.

Table 4 documents City water demand by water use sectors (customer types) for calendar years 1990, 1995, 2000, and current conditions. In **Table 4**, the water use sectors (customer types) are listed on the left. The data for 1990 and 1995 are based on the demand distribution for fiscal year 2000-2001. Irrigation is equivalent to landscape irrigation, because no significant agriculture exists in the area. Recycled water used for irrigation is included in the irrigation customer type. There are no sales to other agencies, saltwater barriers, groundwater recharge, or conjunctive use projects in Sunnyvale.

As shown in **Table 4** and **Figure** 7, water demand in the City of Sunnyvale is divided into five customer type groups: single family residences, multiple family residences, commercial/industrial uses, irrigation, and other (includes construction, fire, and other uses). Single family residences have the largest water use, amounting to approximately 36 percent of the total in fiscal year 2003-2004. Multiple family residences account for 27 percent of demand, followed by commercial/industrial uses, irrigation, other uses accounting for 22 percent, 12 percent, and 3 percent respectively. Commercial/industrial includes recycled water used onsite at the wastewater treatment plant. The irrigation customer type category only includes dedicated irrigation meters. Single family and multiple family homes may use part of their domestic water supply to irrigate their properties; this use would be included in the residential water demand. Total demand has been relatively stable over the past ten years ranging between 22,347 AFY (1995) to 25,592 AFY (2000) with an average of 24,356 AFY. Total demand in 2005 was 25,300 AFY. The City of Sunnyvale's water demand was over 30,000 AFY in the late 1980's but the demand has decreased significantly through conservation and new plumbing codes requiring water saving devices (low flow toilets). The water demand in the summer months is approximately twice as large as the winter demand. The summer increase in demand is likely due to increased irrigation demand.

The Sunnyvale ITR is organized into three scenarios of potential development, each with a different mixture of customer types and densities (residential, commercial, park area). **Table 3** shows a summary of land use development for each scenario. The proposed development for these three scenarios is also shown on **Figures 3** through **5**. Each scenario includes a different number of residential units, square footage of commercial space, and park area.

The Sunnyvale ITR project would rezone much of the existing industrial area to residential use. All residential units on the property are expected to be multi-family dwellings including flats and town homes. As shown in **Table 3,** the number of units varies under the three scenarios. Scenario 1 represents the most number of units (2,842 dwelling units or du), as it includes a large portion of the study area and densities R-3 (13-24 du/ac) and R-4 (25-36 du/ac). Although the densities are given as a range, the maximum number of units is used to provide the most conservative (highest water demand) estimate. The development plan in Scenario 2 includes lower density zoning than Scenario 1: R-2 (10-12 du/ac) and R-3 (13-24 du/ac). Scenario 2 would include a maximum of 1,395 units. Scenario 3 maintains the same density as Scenario 1 but involves only a portion of the project area. The maximum number of units would be 2,049. The water consumption of retail/office use depends on the specific use and the floor area, usually measured in square feet. The commercial space was estimated using a floor area ratio (FAR, relating floor area to total area) of 25 percent. Thus 25 percent of the total area zoned as retail will be retail floor space and the rest may be parking lots. Because the water use of restaurants can be much larger than that of other retail types, retail was subdivided into general retail/office and restaurant categories. The amount of restaurant space in the development is currently unknown but was estimated as 25 percent of the total retail area. The Sunnyvale ITR also proposes about 10.13 acres of irrigated park land in Scenarios 1 and 2, and 7.43 acres in Scenario 3.

The type of land use and the extent (dwelling units or square feet) indicate the future water demand. To determine the proposed increase in water demand, water use coefficients were developed for residential use (townhouse and multi-family) as well as retail and park use. The total water demands for each scenario are shown in **Table 5,** while the water use coefficients (acre-feet per unit, acre-feet per sq ft, or acre-feet per acre) used for each type are shown in **Table 6**. Retail was subdivided into restaurant and general retail/office, each with representative water use coefficients.

To calculate the total water demand for the multi-family units, both the volume of water used indoors and outdoors was calculated. The indoor water demand per unit in AFY is shown **Table 6** and was calculated by assuming 2.5 people per unit and applying a per capita water use factor. According to the 2000 U.S. Census, the average household in the City of Sunnyvale contained 2.5 people. This is confirmed by ABAG 1996 data that also reported household size in Sunnyvale for 1980 (2.44 people per unit), 1990 (2.39 people per unit), and 1995 (2.5 people per unit). A per capita indoor water use factor of 60 gallons per person per day was used (Gleick 2002). The California Department of Water Resources (DWR) collects and publishes data on urban water use in California on its website. In 2001 (the most recent data available), DWR reported multifamily homes in the South Bay/Peninsula area used approximately 20 percent of the total water consumption for outdoor use (i.e., irrigation). Accordingly, the total water use per unit was calculated as 0.210 AFY, with 0.168 AFY indoors and 0.042 AFY outdoors. The total

estimated residential water demands for the development scenarios are shown in **Table 5**.

Table 6 also shows the water use coefficients for retail space (restaurant and general retail/office) and park irrigation. The water use coefficients (in gallons per square foot) for retail space are from an environmental impact report for a development in North San José. The water demand for park irrigation was estimated as the average monthly evapotranspiration demand of turf, less the average monthly precipitation. The irrigation water demand of the turf was calculated for each month (January through December) and totaled to obtain a yearly water demand. Irrigation efficiency was assumed to be 90 percent. The total water applied to parks was estimated to be 3.5 AFY per acre, which could be supplied with recycled water assuming that extension of infrastructure is feasible.

The proposed site for this rezoning is currently a developed commercial/industrial area. The site is served by the City of Sunnyvale and the water use is monitored by seven meters (3 irrigation meters and four domestic meters). **Table 7** documents water demands for the existing development. The total water demand in 2005, a wet year, was 140 AFY (94.4 percent irrigation and 5.6 percent commercial/industrial). In 2003, a normal rainfall year, the water demand of the site amounted to 155 AFY (94.5 percent irrigation and 5.5 percent commercial/industrial). The 2005 water demand was assumed to represent current demand. This assumption is conservative because it likely underestimates current demand and thus exaggerates the change in demand due to the proposed development, which would replace the current water demand with the demand calculated in **Table 5.** Comparison of **Tables 5 and 7** shows that the proposed redevelopment would increase demand on the site by as little as 223 AFY in Scenario 2 (363 – 140 AFY) to as much as 527 AFY in Scenario 1 (667.4 – 140 AFY).

The total demand on the City of Sunnyvale service area over time is shown in **Tables 8a, 8b, and 8c** assuming the three development scenarios respectively. The development is anticipated to be complete by 2015. For planning purposes, it is estimated that the project will be 50 percent complete by 2010. No significant additional development is included in the demand estimates, as the water supply assessment focuses only on the increase due to the rezoning of the project area. **Figure 7** illustrates the total annual water demand for the City of Sunnyvale for each of the three scenarios at build out (2015), compared with the past water demand. The water demand is greatest in Scenario 1 (25,827 AFY).

Water Demand in Normal and Drought Periods

Figure 8, showing the City of Sunnyvale's water supply from 1976 through 2004, also includes the single year drought of 1977 and the multiple year drought of 1989-1992. In anticipation of future droughts the City has developed a Water Shortage Contingency Plan.

The Water Shortage Contingency Plan summarized in the City of Sunnyvale's 2005 Urban Water Management Plan creates stages of action, or in other words, various levels of conservation needed to respond to the severity of the supply reduction. Each stage represents a different level of the demand reduction program to be enforced by the City during a supply shortage, beginning with Stage 1, corresponding to a supply reduction of 25 percent and proceeding with Stages 2, 3, and 4. Each stage has mandatory prohibitions and associated water

conservation actions to reduce demand to meet the reduced supply. The water conservation actions plans include a water rate structure for conservation and enforcement of prohibitions by the City. These demand reductions and irrigation restrictions only apply to potable water. The four stages of action are briefly described below.

Stage No.	Percent Water Supply Shortage	Mandatory Prohibitions
1	25	• Flooding or Runoff On Sidewalks, Streets, or Gutters • Cleaning Sidewalks, Driveways, or Other Paved Areas • Using Hose for Washing Cars With Automatic Shutoff • Use of Decorative Fountains • Water for Construction (Unless No Reclaimed Water Available) • Water Waste Due to Broken/Defective Plumbing • Restaurant Water Service (Unless Requested) • Landscape Irrigation During Daylight Hours Hydrant Flushing
2	35	• New Installation of Plants • New Swimming Pool Construction • Filling or Refilling Swimming Pools • Outdoor Watering December Through March
3	45	• Watering Grass or Turf (Minimum Water Allowed To Playing Fields) • Golf Course Irrigation (Except Tees And Greens)
4	50 or greater	• Landscape Irrigation Where Recycled Water is Available for Connection

To predict the future impact of normal, single dry years, and multiple dry years on supply, the City of Sunnyvale assessed Water Service Reliability in their 2005 Urban Water Management Plan. To forecast the water supply of the City with the proposed ITR project, an independent analysis was conducted of the water supply available during a drought.

Table 9 and **Tables 10a-10c** present an analysis of how water demand will change in response to drought. **Table 9** represents existing customer types and **Tables 10a-10c** represent future customer types for each proposed scenario. The left columns in the tables show the customer types (water use sectors) in the City of Sunnyvale and the water demand in a normal rainfall year. In the Santa Clara Valley Water District *2005 Urban Water Management Plan (SCVWD UWMP),* the reduction in supply during the 1977 drought is used to predict the reduction of supply during a future single year drought and the supply during 1988 to 1992 was used to predict supply in future multiple dry years. The reduction of total water supply to the City during the 1977 single dry year and the 1989-1992 multiple dry years were 21.7 percent and 26.1 percent, respectively. The goal of the City during dry years is to reduce demand by the same amount as the reduction in supply.

In the SCVWD UWMP, the effect of a drought on the entire county's water supply is discussed. Based on the reduction of supply to the entire county, the reduction of supply to the City of Sunnyvale can be estimated as a reduction of 21 percent (to 79 percent of normal) during a single dry year and 27 percent (to 73 percent of normal) during multiple dry years. The reduction of individual supply sources is discussed in more detail in the water supply during

drought section. The water contingency stages described above are triggered by the decrease in supply. For example a 27 percent reduction in supply (multiple dry years) would trigger Stage 2. The actions taken at each stage are designed to reduce demand to match the reduction in supply. For this analysis, the predicted demand reduction is conservatively estimated to be less than the supply reduction. The anticipated reduction for a severe single year and a multiple year drought is expected to be 15 percent and 20 percent respectively. This response is similar to the response during 1988 to 1992 drought, when a 20 percent reduction in water demand was observed.

Installation of water-conserving plumbing (as mandated by the current building code) will conserve water overall, but will reduce the ability to save water in the long term, a phenomenon termed "demand hardening." This is not accounted for in **Table 10**. Lastly, given the reliability of recycled water in normal years and in drought, its future use would obviate the need for significant landscape irrigation conservation. This is approximated in **Table 10** by weighting the expected demand reduction by the percent of the demand that is anticipated to be supplied from recycled water. For example, the 2015 total irrigation demand in Scenario 1 is 2,807 AF. The amount of the demand, accounted separately as irrigation, to be supplied by recycled water is 786.7 AF. This includes 751.3 AF currently served and 35 AF for future irrigation use. A minor amount of additional recycled water use is subsumed in the multifamily residences category. A portion (74 percent) of this irrigation demand is supplied by potable water, thus the decrease during drought will affect only this portion of the demand. In a multiple year drought, the potable demand would be decreased by 20 percent, or 14.8 percent of the total demand (74 percent of the 20 percent reduction).

Different customer types entail a different potential for water conservation during a drought. Each scenario was examined individually to determine which mix of proposed land use has the potential for the greatest water demand during a drought. Scenario 1 has the highest water demand in a normal year, a single dry year, or multiple dry years.

WATER SUPPLY

Water is supplied to the City of Sunnyvale area primarily as imported water from San Francisco Public Utility Commission (SFPUC) and Santa Clara Valley Water District (SCVWD). Seven active groundwater wells and two backup wells in the City are used as a supplementary source and backup system in the event of a temporary interruption of the imported water. Recycled water has been used in the area since 1998 and current City ordnances require the use of recycled water when available.

The City of Sunnyvale's service area is mainly governed by the city limits. Within the service area, separated pressure zones for the different water supply sources are maintained. **Figure 2** shows a simplified version of the water supply zones, showing the area served by SFPUC and the area served by SCVWD through either imported water or groundwater. The project area is located in the SFPUC area and the demand of the project will be satisfied by SFPUC water. Other sources of water will serve as a backup during temporary interruptions of service or long-term droughts. A few small areas within the city are served by the California Water Service Company (Cal Water). The areas served by Cal Water were at one time unincorporated parts of the county since annexed by the City.

Table 11 lists the existing and proposed water supply sources in terms of water rights, entitlements, and contracts. **Table 12** summarizes historic and current water supply sources under normal conditions. Data are reported in five-year increments in order to provide a long-term overview. For the historical data, a near-normal rainfall year was selected to represent each five-year increment, as summarized in the footnote to **Table 12**. Currently, imported water from SFPUC contributes 44.2 percent and SCVWD contributes 41.6 percent of the total water supply for Sunnyvale. Groundwater contributes 6.6 percent of the total supply and the remaining 7.5 percent is supplied by recycled water. **Figure 8** shows the water supply by source from 1976 to 2005.

Table 13 show the projected supply in the Sunnyvale area for Scenario 1. This scenario is currently the preferred alternative. With the proposed development outlined in the Sunnyvale ITR project, the total water demand in the City is increased in Scenario 1 by 527 AFY (the difference in current water demand from 25,300 AFY in 2005 and the 25,827 AFY for future water demand in 2015). The total potable water demand of Scenario 1 is anticipated to be met with imported water from SFPUC in a normal water year. The City of Sunnyvale has a maximum entitlement of 16,800 AFY (City of Sunnyvale UWMP, 2005). Deliveries to the City over calendar year 2005 totaled 10,868 AFY.

Recycled water is also a future source of water supply. The amount supplied is limited by the available uses, which are described in greater detail in the Recycled Water section. The needed additional supply of recycled water for each Scenario is shown in **Table 14.** A total of 2,006 AFY of recycled water in Scenario 1 is expected to be supplied by 2015, including an additional 155 AFY (35 AFY for park irrigation and 119 AFY for irrigation around the multifamily units).

Imported Water

San Francisco Public Utility Commission (SFPUC)

SFPUC manages the Hetch-Hetchy water system for the City of San Francisco and 29 wholesale water agencies in three Bay Area counties. The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the agencies that purchase the water and devises policies to ensure equitable distribution to the all parties. In 1952, the City of Sunnyvale entered into a contractual agreement with the City and County of San Francisco. The current contract entitles the City of Sunnyvale to a maximum entitlement of 16,800 acre-feet per year and will expire in 2009. Contract negotiations are underway to extend these deliveries into the future. No change in the entitlement is expected in the near future. In the past, deliveries from SFPUC have ranged from 8,007 AF in 1991 to 16,287 AF 1987. As illustrated in **Figure 8**, the supply from SFPUC typically comprises about 45 percent of the total water supply.

Santa Clara Valley Water District (SCVWD)

SCVWD has contracts with the State of California Department of Water Resources and the United States Bureau of Reclamation to receive, treat, and distribute surface water in the Santa Clara Valley. In 1972 SCVWD entered into the first contract to supply the City of Sunnyvale with imported water. Another contract initiated in 1981 remains in effect until 2051. The contract established a schedule of water deliveries where the amount of water delivered is reviewed every two years. The City may have access to surplus water as available.

Water supply data are available from the City of Sunnyvale from 1975 to present. The annual contributions of each water source are shown in **Figure 8**. Imported water has been the primary source of water over the period of record, supplemented with both groundwater and recycled water. Imported water is expected to remain the primary water supply for the City of Sunnyvale.

Groundwater Supply (SCVWD)

As indicated in **Figure 8** and **Table 12**, groundwater has been a relatively small but significant source of water supply for the City of Sunnyvale. Groundwater is available from the Santa Clara Valley groundwater basin, which is managed by SCVWD in collaboration with other agencies. The City of Sunnyvale currently has seven active production wells and two inactive wells; locations are shown on **Figure 1**. The wells are located in the confined portion of the Santa Clara Valley groundwater basin. Their depths range from 412 to 778 feet and their capacities range from 400 gallons per minute to 1,800 gallons per minute. The combined capacity of the nine wells is reported at 6,650 gpm (Val Conzet, personal communication). Assuming these wells were pumped on a year-round basis for 12 hours per day, they would produce 5,400 AFY. However, the wells are currently maintained as a primary water supply for only a portion of the city and as backup water supply for the remainder. As illustrated in **Figure 8**, the maximum groundwater usage (8,500 AF) occurred in 1984 producing 28 percent of the total water supply. Over the past ten years groundwater has been used less, averaging 1,100 AF or only 4 percent of the total supply. These wells are monitored regularly per California

Department of Health Services (DHS) standards to ensure water supply readiness in terms of both quality and quantity. On **Table 11**, no entitlement or water right is indicated because the Santa Clara Valley groundwater basin has not been adjudicated and groundwater entitlements or rights have not otherwise been defined.

The long-term reliability of groundwater supply for the project is defined by the overall state of the groundwater basin. This is recognized by the SB610 sections of the California Water Code, which require a detailed description and analysis of the location, amount, and sufficiency of groundwater to be pumped. The following sections describe the Santa Clara Valley groundwater basin, its management, and existing condition in terms of groundwater quantity and quality.

Santa Clara Valley Groundwater Basin

The City of Sunnyvale overlies the confined portion of Santa Clara subbasin, part of the larger Santa Clara Valley Groundwater Basin, designated by the Department of Water Resources (DWR) with groundwater basin number 2-9.02 (California DWR, October 2003). The Santa Clara subbasin occupies a structural trough between the Diablo Range on the east and the Santa Cruz Mountains on the west. It extends from the northern border of Santa Clara County to Coyote Narrows. The Santa Clara valley is drained to the north by tributaries to San Francisco Bay including Coyote Creek and the Guadalupe River.

The principal water bearing formations of the Santa Clara subbasin are alluvial deposits of unconsolidated to semi-consolidated gravel, sand, silt and clay (DWR, October 2003). The permeability of the valley alluvium is generally high and most large production wells derive their water from it (DWR 1975). The southern portion and margins of the subbasin are unconfined areas, characterized by permeable alluvial fan deposits. A confined zone is created by an extensive clay aquitard in the northern portion of the subbasin (SCVWD, July 2001). This aquitard divides the water-bearing units into an upper zone and a lower zone; the latter is tapped by most of the local wells.

Groundwater in the Santa Clara subbasin is recharged through natural infiltration along stream channels and by direct percolation of precipitation. In addition, SCVWD maintains an active artificial recharge program. Groundwater flow generally is from the margins of the basin toward San Francisco Bay.

Water Resources Management

SCVWD is the groundwater management agency in Santa Clara County (as authorized by the California legislature under the Santa Clara Valley Water District Act) and has the primary responsibility for managing the Santa Clara Valley groundwater basin. SCVWD has worked to minimize subsidence and protect groundwater resources through artificial recharge of the groundwater basin, water conservation, acquisition of surface water and imported water supplies, and prevention of water waste.

The District's principal water supply planning documents are the *Draft Integrated Water Resources Plan 2003* (IWRP) and the *2005 Urban Water Management Plan.* The IWRP identifies sources of risk and uncertainty that may affect the District's future management. Potential risks include random occurrences of hazards and extreme events, climate change, more stringent water quality standards, uncertainty of future imported water supplies, and growth in water demand that is greater than projected. The District is dedicated to providing a reliable water supply to the people and businesses of Santa Clara County. In order to meet these water needs in the future and manage potential risk, SCVWD maintains a flexible management of the water resources. SCVWD also prepared the 2005 Urban Water Management Plan which summarizes its groundwater supply management, groundwater monitoring, and groundwater quality management programs.

The groundwater supply management program is intended to replenish the groundwater basin, sustain the basin's water supplies, help mitigate groundwater overdraft, and sustain storage reserves for use during dry periods. SCVWD operates artificial recharge systems to augment groundwater supply, including the groundwater in the vicinity of Sunnyvale wells. SCVWD also conserves local surface water, provides imported water, operates water treatment plants, maintains water conveyance systems, supports water recycling, and encourages water conservation.

Groundwater Quantity

Groundwater conditions throughout the County are generally very good, reflecting SCVWD's water management efforts (SCVWD, July 2001). Historically, groundwater pumping caused groundwater level declines that induced subsidence in the confined portion of the Santa Clara subbasin and saltwater intrusion into aquifers adjacent to San Francisco Bay. These declines were halted in the mid-1960s and then reversed through the artificial recharge program and the importation of surface water. Groundwater levels in the Santa Clara Valley have generally risen since 1965 as demonstrated by hydrographs of index wells monitored by SCVWD; these hydrographs can be viewed online:

http://www.valleywater.org/Water/Where_Your_Water_Comes_From/Local_Water/Wells/Depth-to-Water_Index_Well_Hydrographs.shtm

SCVWD recognizes the benefits of using the vast subsurface storage provided by the groundwater basin, particularly during drought. SCVWD has defined an operational groundwater storage capacity that amounts to 350,000 acre-feet in the Santa Clara Valley subbasin (SCVWD, 2001). This storage is defined in part by the groundwater levels that need to be maintained to prevent subsidence and saltwater intrusion problems.

In its *Integrated Water Resources Plan*, SCVWD has analyzed the reliability of its water supplies in very wet years, average years, and dry years, including successive dry years (SCVWD, June 2004). The IWRP concludes that SCVWD water supplies are sufficient for very wet years and normal years. In addition, the IWRP states that SCVWD will be able to meet the water needs of Santa Clara County during single dry years, even with increasing demand. However, SCVWD is challenged to meet demands in multiple dry years, when water supplies

become increasingly reliant upon storage reserves, including groundwater storage with its risk of inducing land subsidence. The IWRP indicates that additional water supply management activities must be developed to meet the water demands of Santa Clara County businesses and residents.

Groundwater Quality

Overall, groundwater quality in the Santa Clara Valley is good. The groundwater in the major producing aquifers is generally of a bicarbonate type, with sodium and calcium as the principal cations (DWR, 1975). Although hard, it is of good to excellent mineral composition and suitable for most uses. Treatment has not been needed to meet drinking water standards in public supply wells (SCVWD, July 2001).

As required by the California Department of Health Services (DHS) for the Drinking Water Source Assessment and Protection (DWSAP) Program, drinking water source assessments have been conducted for the four groundwater wells. The assessment was conducted by the Sunnyvale Municipal Water System (SJMWS) staff and included information gathered from City records, data bases, and staff; the Regional Water Resources Control Board; and visual field surveys. The assessments concluded that contaminants have not been detected in the four wells although the wells are vulnerable to potential contamination from local sources and activities. These include electronic manufacturing facilities, gas stations, confirmed leaking underground storage tanks, and sewer collection systems. However, well location and construction in combination with the local hydrogeology have provided a high level of protection against contamination of the local groundwater (California DHS, 2003).

A review of available water quality data (1997-2004) for the seven active and two inactive wells indicates that contaminants have not been detected above water quality standards in any of the wells. Analyses have included regulated organic chemicals, purgeable organic compounds, and general mineral, physical and inorganic chemicals. Nitrate as nitrate has been detected in all four wells in 1999 ranging between 3.9 and 36.5 parts per million (ppm). These detections are within the water quality standard (primary maximum contaminant level) of 45 ppm. However, as the observed concentrations are greater than 50 percent of the MCL, the City now conducts monitoring more often than is required to monitor possible changes in water quality.

SCVWD has ongoing groundwater protection programs that include well permitting, well destruction, wellhead protection, leaking underground storage tank programs, toxic cleanup, land use and development review, nitrate management (targeted to areas of elevated nitrate in the South County), and saltwater intrusion programs (SCVWD, July 2001). SCVWD collects water quality data from 60 wells throughout the groundwater basin.

Saltwater intrusion has occurred in the shallow aquifer in the northern part of the basin. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped (SCVWD, July 2001). Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells

that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone (SCVWD, July 2001). In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells. SCVWD also monitors saltwater intrusion, collecting water quality samples quarterly from 16 wells in the upper aquifer and 5 wells in the lower aquifer in the vicinity of the intruded area.

Recycled Water

The City of Sunnyvale has produced and sold recycled water since 1998 (**Figure 8**). The City complies with all regulations on recycled water including the preparation of a Recycled Water Program Master Plan and annual reports. Approximately 10 percent of the city's wastewater is currently treated to the level necessary to meet recycled water standards and is delivered primarily to customers for irrigation needs.

Water recycling is an element of SCVWD planning for future water supplies, as summarized in the draft document, *Integrated Water Resources Planning Study 2003-Draft* (SCVWD, June 2004). Water recycling is part of SCVWD's baseline projection, which envisions recycled water use throughout Santa Clara County of 16,000 AFY by 2010, including recycled water from Sunnyvale's Water Pollution Control Plant (WPCP). SCVWD also considers water recycling as a building block with an estimated potential future use of 33,000 AFY. Since 1993, SCVWD has provided financial assistance to the Sunnyvale recycled water system.

As shown in **Table 11**, water recycling has been identified as a water supply source for the Sunnyvale service area. Recycled water can provide for landscape irrigation, ornamental features (fountains), toilet flushing, and specific industrial uses. As shown in **Table 12**, recycled water use in Sunnyvale amounted to 1,851 AF in 2005. Most of the recycled water is used in operations of the WPCP and about 750 AFY is used for irrigation. It is assumed that this use will continue and increase in the future. The City of Sunnyvale has a policy statement which states "that recycled water shall be used within its jurisdiction whenever feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment."

Recycled water also can be extended to supply additional existing landscape irrigation demand (on separate landscape meters and around multi-family complexes) and to supply the irrigation demand of proposed multi-family, commercial, industrial, and park land uses. Dual plumbing, while possible for multi-family units and other uses, has not been considered as a potential use of recycled water because of the considerable cost and oversight needed for implementation.

In addition to existing uses, recycled water could be extended to serve the landscape irrigation water demands of residential, commercial, industrial and park land uses proposed as part of the Sunnyvale ITR. **Table 14** shows the current recycled water demand and potential demand for recycled water by customer type under each scenario.

With regard to proposed multi-family complexes, both town homes and flats, the expected increase in water demand amounts to as much as 298.6 AFY. DWR has published data on the water used indoors as a portion of the total water use for residential units. In the South

Bay/Peninsula, DWR reports that 20 percent of water is used for outdoor use in a multi-family home. Assuming that all of the outdoor demand is for landscape irrigation, then 119 AFY of the demand could be served potentially by recycled water in Scenario 1. All of the irrigation needs in the park area may also be satisfied by recycled water, amounting to 35 AFY in Scenario 1.

The amount of future demand that may be served by recycled water ranges from 94 AFY in Scenario 2 to 155 AFY in Scenario 1. The total demand that could be met by recycled water would vary from 1,945 AFY to 2,006 AFY. It should be noted that the above estimated future demand for recycled water does not include landscape irrigation around single family homes, retail uses, or dual plumbing.

Water Supply in Normal and Drought Periods

While **Tables 12 and 13** documents past, current and future water supply under normal conditions, **Tables 15 and 16** quantify the amount of water supply during normal and drought conditions, given current conditions and projected conditions with the Sunnyvale ITR project, respectively. The California Water Code section 10910 (also termed Senate Bill 610 or SB610) requires a discussion of how supply will meet demand during normal, single dry, and multiple dry water years during a 20-year projection. These 20-year projections of supply during normal and dry years are shown in **Table 16**. The Sunnyvale ITR is expected to reach build out by 2015 and the demand is expected to remain the same from 2015 to 2025. In **Tables 15** and **16**, the imported water supply in dry years is reduced based on past supply during droughts, with groundwater used to supplement supply.

The Sunnyvale ITR project area is located in the part of the City primarily served by SFPUC. In the case of a temporary interruption of the SFPUC system, water from other sources (SCVWD, groundwater, or from nearby cities) may be used as supplemental sources.

BAWSCA, the agency that represents the purchasers of SFPUC wholesale water, has created an Interim Water Shortage Allocation Plan (IWSAP). The IWSAP establishes the amount of water available from SFPUC in time of drought (up to 20 percent reduction in supplies) and determines how it is shared among the agencies. The IWSAP is based on a two-tier approach to calculate the available water for each agency. The first tier is an agreement between SFPUC and BAWSCA on how the available water will be divided when supplies are reduced by drought. The percentage of total available water delivered to BAWSCA depends on the percent of reduction of available water. The table below, from the City of Menlo Park's Urban Water Management Plan, shows how the supplies are divided:

	Share of Available Water	
Reduction in Water Supply	Required SFPUC Share	Suburban Purchasers (BAWSCA) Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The second tier of the IWSAP allocates the available water to the 29 agencies that purchase SFPUC water. The first step in calculating the available water to the City of Sunnyvale is to determine the portion of total requested water that the City requested for that year. The available water is then allocated based on that same percentage. In other words, the City of Sunnyvale's percentage of the water available to BAWSCA's agencies does not change, but the amount of water available does change. Agencies that bank water or make other long term plans to decrease dependency on imported water are given credit for their work and may receive more water than allocated. In addition, some cities (including the City of Santa Clara and the City of San José) hold different types of contracts with SFPUC and their allocations are reduced by a different method.

To help illustrate the IWSAP, a brief example is calculated below:

Tier 1: The total available water is allocated between SFPUC and the suburban purchasers. If 1) 320,000 AF is available for SFPUC and suburban purchasers in a normal year and 2) a single dry year occurs with an 18 percent reduction of water from Hetch-Hetchy, only 262,400 AF would be available for water supply. SFPUC would be entitled to 37.5 percent of the total (98,400 AF) and the suburban purchasers would be entitled to 62.5 percent of the total available water (164,000 AF).

Tier 2: The available water to the suburban purchasers is allocated to each purchaser. If the City of Sunnyvale had originally requested 12,490 AF (6.47 percent of the amount requested from all the suburban purchasers), they would be entitled to 6.47 percent of the water available or 10,611 AF (6.47 percent of 164,000 AF). The total water supply from SFPUC to the City of Sunnyvale would be decreased 15 percent.

The actual decrease in supply would vary based on the total water requested by all agencies, the decrease in supply, and the adjustments made due to contract type and water banking. In general during a drought, the City of Sunnyvale would see a reduction in supply from Hetch-Hetchy similar to the system-wide reductions.

In the 2005 Urban Water Management Plan, SCVWD assesses the effects of potential droughts on future county-wide water supply and demand by examining the impact of historical droughts. The most extreme single year drought occurred in the Santa Clara Valley in 1977, while the period 1987 to 1992 was marked by a severe multi-year drought. Occurrence of another drought similar in magnitude to that of 1977 would result in a reduction in imported water supplies and in increased groundwater pumping to meet demand (SCVWD 2005). SCVWD predicts that such an extreme single year drought would result in reduction of imported water (including State Water Project, Central Valley Water Project, and transfers from the Semitropic water bank) to 56.3 percent of the normal supply (a reduction of 43.7 percent). Similarly, a multi-year drought similar to 1987-1992 would result in a reduction of imported water supply to 76.4 percent of normal (a reduction of 23.6 percent).

As part of the water supply reliability for Santa Clara County, SCVWD's UWMP also included forecasts of the amount of SFPUC water available during drought conditions. SCVWD estimates a 24.9 percent and 20 percent reduction in supplies to Santa Clara County from Hetch-Hetchy for single dry year and multiple dry years respectively (SCVWD UWMP 2005).

Clearly, these county-wide reductions will result in reductions of imported water supply

to retailers like the City of Sunnyvale. For the purposes of planning the future reliability of water supply in Sunnyvale, it is assumed that the reduction of supply to Sunnyvale during a drought would be comparable to the county-wide reductions. In the case of a drought and reduced imported water, groundwater will be relied on to supplement supply.

Recycled water is recognized for its reliability during dry conditions. Accordingly, in **Tables 15 and 16**, the water supply from recycled water remains constant during normal, single dry, and multiple dry years.

COMPARISON OF SUPPLY AND DEMAND

Table 17 provides a comparison of current water supplies and water demands under normal and drought conditions while **Table 18** compares water supplies and demands in 2025 with Scenario 1 of the Sunnyvale ITR project. Note that water demand is calculated from bills sent to customers and the supply is calculated by the amount of water purchased. Due to the different cycles in the accounting cycles demand is greater than supply for the calendar year 2004.

For this water supply assessment, the water demand for Sunnyvale was based on the proposed land uses and expected water use rates for the various Sunnyvale ITR Scenarios. Based on this methodology, the total build out water demand is expected to be between 25,523 AFY and 25,827 AFY, depending on the scenario, with Scenario 1 involving the highest demand. This additional water demand can be met by increased deliveries from SFPUC. The City of Sunnyvale is entitled to 16,800 AFY from SFPUC. Current deliveries are 10,868 AFY, but have been up to 16,287 AFY in the past (1987). The proposed demand increase for the Sunnyvale ITR project in 2015 is 527 AFY, 2.2 percent of the total water demand.

Because the City of Sunnyvale has created a water contingency plan to enact measures to reduce demand during drought conditions, the City will be able to adequately handle the increase in demand during drought conditions. It is noteworthy that Scenario 1 entails a potential water demand for the City in 2015 of 25,827 AFY, while in the past, City water demand has exceeded 30,000 AFY (1984-1987). Through water conservation and implementation of new plumbing codes, the City has been able to reduce and maintain the total water demand at the current level around 25,000 AFY, approximately 20 percent less than the peak demand of the late 1980's. Since the City of Sunnyvale has served this level of demand without issues in the past, it is reasonable to assume it can meet the proposed level (25,827 AFY) in the future.

This water supply assessment demonstrates that the proposed project water demand can be met through current supplies. Water demand may be decreased further through water demand management. The City of Sunnyvale is currently working (in cooperation SCVWD and other agencies) to conserve water and decrease overall system demand. Their ongoing work in conservation includes the following best management practices (BMPs):

- Water survey programs for residential customers
- Residential plumbing retrofit
- System water audits, leak detection, and repair
- Metering with commodity rates
- Large landscape conservation
- High-efficiency washing machine
- Public information
- School education
- Conservation programs for commercial and industrial customers
- Wholesale agency programs

- Conservation pricing
- Conservation coordinator
- Water waste prohibitions
- Residential ultra-low-flush toilet replacement

These conservation measures and other future programs will decrease the overall water demand. However, as mentioned previously, the ability for short-term drought reduction would be limited as a result of demand hardening.

The City of Sunnyvale has mandated installation of Ultra Low Flow toilets (ULFT) in all new residential units built since 1992. Another household use that presents an opportunity for water conservation is the shower, which accounts for about 20 percent of indoor residential water use. Efficient low flow shower heads can decrease the amount of water used per shower. Newer shower heads use approximately 8 gallons of water less per shower than those on the market in the mid-1990s. In addition, the City of Sunnyvale currently has a program to provide rebates for high efficiency washing machines. It is estimated that the replacement of inefficient toilets, showerheads, washing machines, and dishwashers and the reduction of leaks in residential units would result in a reduction of the average water demand. In addition, water demand can be further decreased through conservation of water used outside the home, or by commercial, industrial, or public users.

CONCLUSIONS

1. The proposed Sunnyvale ITR project entails modification of plans and policies, including the City's General Plan, and implementation of infrastructure improvements to support proposed development.

2. The proposed project entails increased water demands; the greatest increase in demand would result from Scenario 1, the preferred alternative.

3. Proposed sources of water supply include additional imported water from SFPUC, continued supply from SCVWD, groundwater from the Santa Clara Valley groundwater basin, which is managed by Santa Clara Valley Water District (SCVWD), and recycled water.

4. Water demand could increase from the current (2004) 25,300 AFY to 25,827 AFY at build out of the Sunnyvale ITR project in 2015 (under Scenario 1).

5. Groundwater is actively managed by SCVWD to replenish the groundwater basin, sustain the basin's water supplies, help mitigate groundwater overdraft and prevent subsidence, and sustain storage reserves for use during dry periods.

6. Recycled water has been identified as a significant water supply source for the Sunnyvale ITR project for landscape irrigation and other uses. Recycled water could reduce potable demand by 2,006 AFY for Scenario 1 in Sunnyvale by 2015; additional water recycling opportunities exist.

7. The City of Sunnyvale has adequate supplies to meet the demand of this proposed project.

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TABLES

Table 1. Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precip, in	2.12	2.07	1.93	0.93	0.05	0.08	0.05	0.14	0.25	1.14	2.09	1.71	14.30
Temp,°F	56.00	59.22	62.78	65.89	71.45	75.69	78.76	78.75	77.63	71.20	61.43	55.70	67.88
ETO, in	1.35	1.87	3.45	5.03	5.93	6.71	7.11	6.29	4.84	3.61	1.8	1.36	49.35

Sources: Precipitation from Sunnyvale UWMP 2005, Temperature from the NOAA NCDC San Jose station, and evapotranspiration (ETO) from CIMIS San Jose station

Table 2. Population Projections

	2005	2010	2015	2020	2025	2030
ABAG Projections**	133,000	135,000	140,000	146,900	152,500	159,100
Scenario 1	133,000	136,553	140,105	140,105	140,105	140,105
Scenario 2	133,000	134,744	136,488	136,488	136,488	136,488
Scenario 3	133,000	135,561	138,123	138,123	138,123	138,123

** Source: Sunnvale UWMP 2005

Table 3. Summary of Land Use Development Scenarios

	Maximum Residential (dwelling units)	Retail/ Office (square feet)	Restaurants (square feet)	Parks (acres)
Scenario 1	2,842	78,163	26,054	10.13
Scenario 2	1,395	78,163	26,054	10.13
Scenario 3	2,049	0	0	7.43

Table 4. Existing Water Demand by Water Use Sectors, AFY

Customer Type	1990*	1995*	2000*	2004**
Residence - Single	7,917	7,947	9,035	8,712
Residence - Multi	5,655	5,676	6,454	6,534
Irrigation	2,941	2,952	3,356	2,904
Commercial	5,655	5,676	6,454	6,424
Other	452	454	516	726
TOTAL	22,621	22,705	25,814	25,300

Includes potable and recycled water deman

*Customer Type amounts estimated from total demand based on data for fiscal year 2000-200

**Customer Type amounts estimated from total demand based on data for fiscal year 2003-200

Table 5. Summary of Development Scenarios Water Demand in 2015, AFY

	Residential	Retail/ Office	Restaurants	Parks	Total
Scenario 1	597.3	6.4	28.3	35.4	667.4
Scenario 2	293.2	6.4	28.3	35.4	363.3
Scenario 3	430.6	0.0	0.0	26.0	456.6

Table 6. Water Use Coefficients

Residential	Indoor				Outdoor			Total per Unit	
	People/ unit	Gallons per capita	Gallons per unit	AFY per unit	Portion used outdoors	Gallons per unit	AFY per unit	Gallons per unit	AFY per unit
Townhome / Flats	2.5	60	150	0.168	20%	38	0.042	**188**	**0.210**
Other			**Gal /sq ft**	**AFY /sq ft**	**Portion used outdoors**		**AFY per Ac**		**AFY /sq ft**
Restaurants			0.97	0.0011	0%				**0.0011**
Other Retail			0.073	0.0001	0%				**0.0001**
Parks				0	100%		3.50		**3.496**

Table 7. Current Water Demand on Project Site, AFY

	Irrigation	Commercial/ Industrial	TOTAL
2003	146.6	8.5	155.2
2004	132.6	8.4	141.0
2005	132.1	7.9	140.0

Table 8a. Proposed Water Demand Under Scenario 1, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	8,712	8,712	8,712	8,712
Residence - Multi	6,833	7,131	7,131	7,131
Irrigation	2,790	2,807	2,807	2,807
Commercial	6,433	6,451	6,451	6,451
Other	726	726	726	726
TOTAL	25,493	25,827	25,827	25,827

* Includes potable and recycled water demand

Table 8b. Proposed Water Demand Under Scenario 2, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	8,712	8,712	8,712	8,712
Residence - Multi	6,681	6,827	6,827	6,827
Irrigation	2,790	2,807	2,807	2,807
Commercial	6,433	6,451	6,451	6,451
Other	726	726	726	726
TOTAL	25,341	25,523	25,523	25,523

* Includes potable and recycled water demand

Table 8c. Proposed Water Demand Under Scenario 3, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	8,712	8,712	8,712	8,712
Residence - Multi	6,749	6,965	6,965	6,965
Irrigation	2,785	2,798	2,798	2,798
Commercial	6,416	6,416	6,416	6,416
	726	726	726	726
TOTAL	25,388	25,616	25,616	25,616

* Includes potable and recycled water demand

Table 9. Existing Water Demand in Normal and Dry Years, AFY

		Estimated Drought Reduction			Multiple Dry		
Customer type	**Normal (2004)**	**Stage 1**	**Stage 2**	**Single dry**	**2**	**3**	**4**
Residence - Single	8,712	15.0%	20.0%	7,405	6,970	6,970	6,970
Residence - Multi	6,534	15.0%	20.0%	5,554	5,227	5,227	5,227
Irrigation	2,904	11.1%	14.8%	2,581	2,473	2,473	2,473
Commercial	6,424	15.0%	20.0%	5,460	5,139	5,139	5,139
Other	726	15.0%	20.0%	617	581	581	581
TOTAL	25,300	14.2%	19.0%	21,617	20,390	20,390	20,390

Table 10a. Future Water Demand in Normal and Dry Years Scenario 1, AFY

		Estimated Drought Reduction			Multiple Dry		
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**2**	**3**	**4**
Residence - Single	8,712	15.0%	20.0%	7,405	6,970	6,970	6,970
Residence - Multi	7,131	14.7%	19.7%	6,080	5,729	5,729	5,729
Irrigation	2,807	10.8%	14.4%	2,504	2,403	2,403	2,403
Commercial	6,451	15.0%	20.0%	5,483	5,160	5,160	5,160
Other	726	15.0%	20.0%	617	581	581	581
TOTAL	25,827	14.1%	18.8%	22,089	20,843	20,843	20,843

Table 10b. Future Water Demand in Normal and Dry Years Scenario 2, AFY

		Estimated Drought Reduction			Multiple Dry		
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**2**	**3**	**4**
Residence - Single	8,712	15.0%	20.0%	7,405	6,970	6,970	6,970
Residence - Multi	6,827	14.9%	19.8%	5,812	5,473	5,473	5,473
Irrigation	2,807	10.8%	14.4%	2,504	2,403	2,403	2,403
Commercial	6,451	15.0%	20.0%	5,483	5,160	5,160	5,160
Other	726	15.0%	20.0%	617	581	581	581
TOTAL	25,523	14.1%	18.8%	21,821	20,587	20,587	20,587

Table 10c. Future Water Demand in Normal and Dry Years Scenario 3, AFY

		Estimated Drought Reduction			Multiple Dry		
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**2**	**3**	**4**
Residence - Single	8,712	15.0%	20.0%	7,405	6,970	6,970	6,970
Residence - Multi	6,965	14.8%	19.8%	5,933	5,589	5,589	5,589
Irrigation	2,798	10.8%	14.4%	2,495	2,394	2,394	2,394
Commercial	6,416	15.0%	20.0%	5,453	5,133	5,133	5,133
Other	726	15.0%	20.0%	617	581	581	581
TOTAL	24,890	14.1%	18.8%	21,903	20,666	20,666	20,666

Table 11. Water Supply Sources

Supply	AFY	Entitlement	Right	Contract	Ever used
SFPUC (Imported Water)	16,800	x		x	yes
SCVWD (Imported Water)	13,557	x			yes
SCVWD (Groundwater)*	8,467				yes
Recycled Water**	1,851				yes

*Based on the maximum annual groundwater production (1984)
** Based on maximum annual usage (2005)

Table 12. Past and Present Water Supply in a Normal Year, AFY

Water Supply Sources	1980*	1985	1990	1995	2000	2005
SFPUC (Imported Water)	15,179	12,422	8,766	12,216	10,730	10,868
SCVWD (Imported Water)	5,651	9,509	10,991	12,915	12,773	10,232
SCVWD (Groundwater)*	6,038	8,257	2,401	616	1,189	1,631
Recycled Water	0	0	0	0	1,317	1,851
Total	26,868	30,188	22,158	25,747	26,009	24,582

* The water received in the nearest normal year (precipitation within 20% of average) was selected. The wate received in 1982 was used for 1980, 1985 for 1985, 1992 for 1990, 1996 for 1995, 2001 for 2000, and 2004 for 2005.

Table 13. Projected Water Supply in a Normal Year Scenario 1, AFY

Water Supply Sources	2010	2015	2020	2025	2030
SFPUC (Imported Water)	12,000	12,000	12,000	12,000	12,000
SCVWD (Imported Water)	10,232	10,232	10,232	10,232	10,232
SCVWD (Groundwater)*	1,631	1,631	1,631	1,631	1,631
Recycled Water	1,928	2,006	2,006	2,006	2,006
Total	25,791	25,869	25,869	25,869	25,869

Table 14. Proposed Recycled Water Use, AFY

		Scenarios		
Customer Type	**No Project**	**1**	**2**	**3**
		Existing		
Landscape	751	751	751	751
Wastewater Treatment Plant	1,100	1,100	1,100	1,100
Subtotal	1,851	1,851	1,851	1,851
		Proposed		
Commercial	0	0	0	0
Multi-Family	0	119	59	86
Parks	0	35	35	26
GRAND TOTAL 2015	1,851	2,006	1,945	1,963
Total in 2010	1,851	1,928	1,898	1,907

Table 15. Current Supply Available by Source for Drought Conditions, AF

Source	Normal*	Single Dry	Multiple Dry Years		
			2	3	4
SFPUC (Imported Water)	10,868	8,271	8,694	8,694	8,694
SCVWD (Imported Water)	10,232	7,531	5,761	5,761	5,761
SCVWD (Groundwater)	1,631	3,965	4,084	4,084	4,084
Recycled Water	1,851	1,851	1,851	1,851	1,851
TOTAL	24,582	21,617	20,390	20,390	20,390

Table 16. Projected Supply Available by Source for Drought Conditions, Scenario 1, AF

Source	Normal (2025)	Single Dry	Multiple Dry Years		
			2	3	4
SFPUC (Imported Water)	11,958	9,100	9,566	9,566	9,566
SCVWD (Imported Water)	10,232	7,531	5,761	5,761	5,761
SCVWD (Groundwater)	1,631	3,452	3,510	3,510	3,510
Recycled Water	2,006	2,006	2,006	2,006	2,006
TOTAL	25,827	22,089	20,843	20,843	20,843

Table 17. Comparison of Current Supply and Demand for Normal and Drought Conditions, AF

			Multiple Dry Years		
Current Supply and Demand	**Normal**	**Single Dry**	**2**	**3**	**4**
Supply total	24,582	21,617	20,390	20,390	20,390
Demand total	25,300	21,617	20,390	20,390	20,390
Difference*	-718	0	0	0	0

* Supply and Demand differ slightly because of varying accounting measures

Table 18. Comparison of 20 Year Projection of Supply and Demand for Normal and Drought Conditions, Scenario 1, AF

			Multiple Dry Years		
2025 Supply and Demand	**Normal**	**Single Dry**	**2**	**3**	**4**
Supply total	25,827	22,089	20,843	20,843	20,843
Demand total	25,827	22,089	20,843	20,843	20,843
Difference	0	0	0	0	0

FIGURES

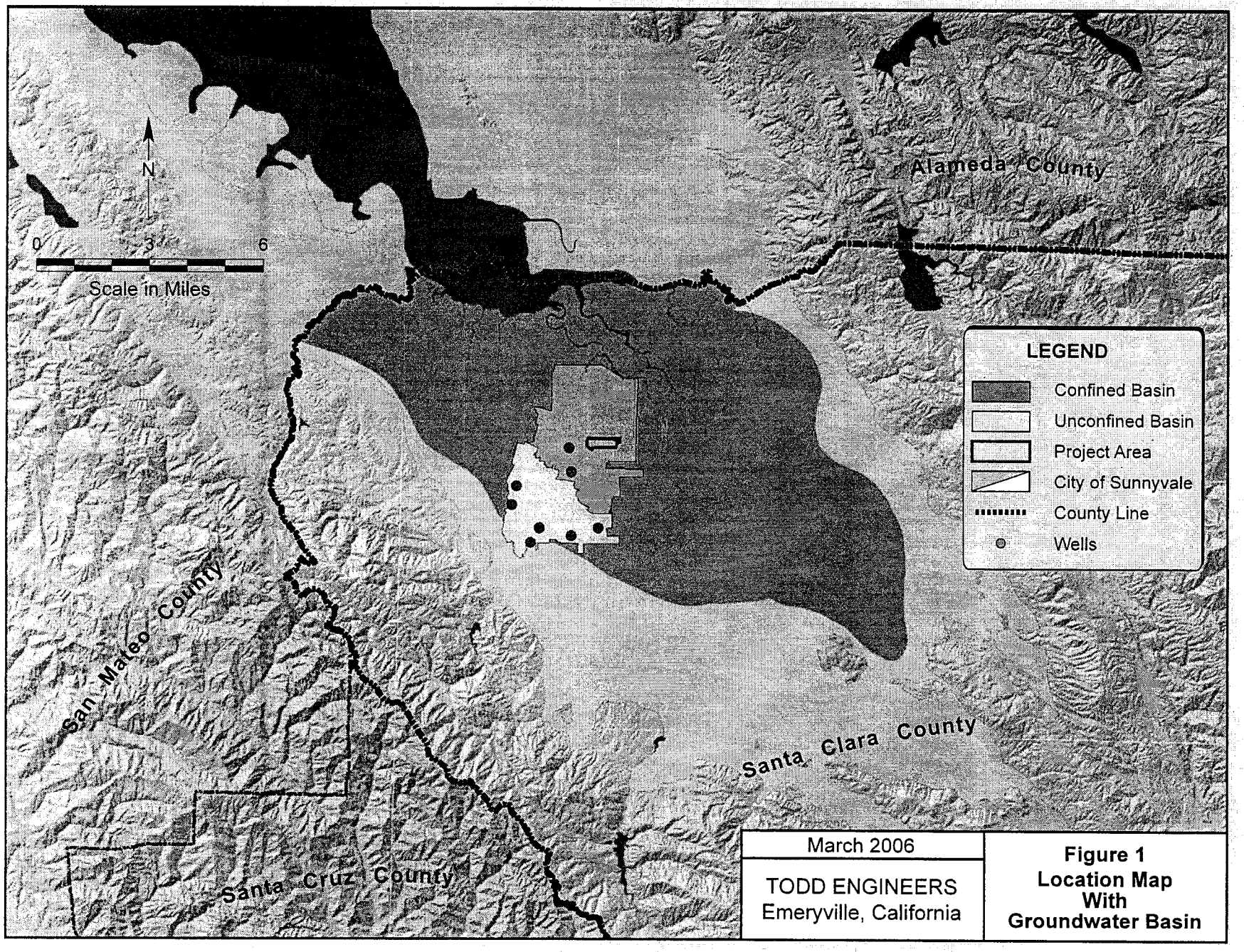

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Figure 1
Location Map With Groundwater Basin

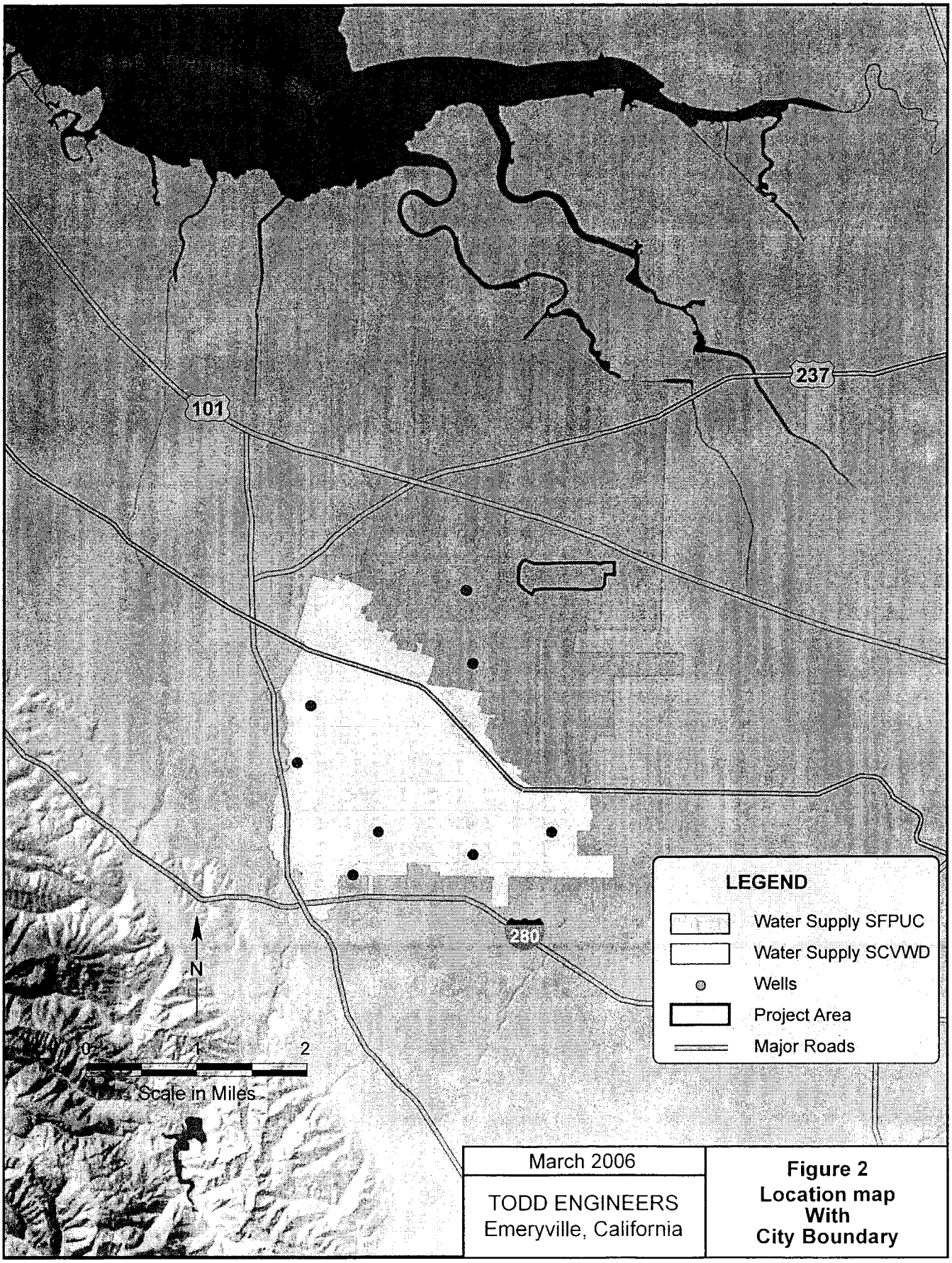

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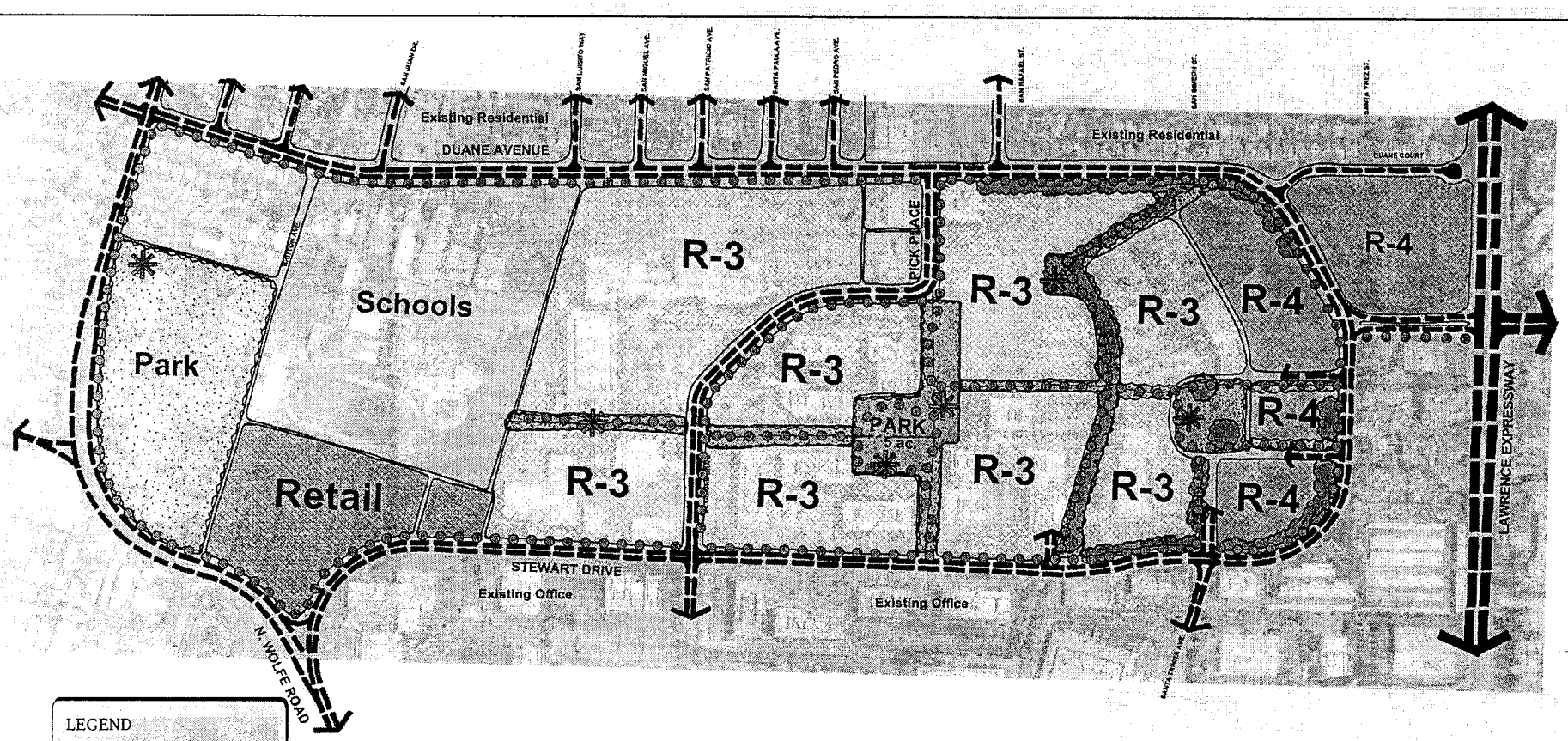
Figure 2
Location map
With
City Boundary



LEGEND

- Pedestrian Path
- Children's Play Area
- Existing Trees

R-2	10 - 12 du/ac
R-3	13 - 24 du/ac
R-4	25 - 36 du/ac

SCALE IN FEET: 1" = 200'

0 100 200 400 600

Source: Randall Planning and Design, January 2006.

Note: Gray shaded area not part of proposed development.

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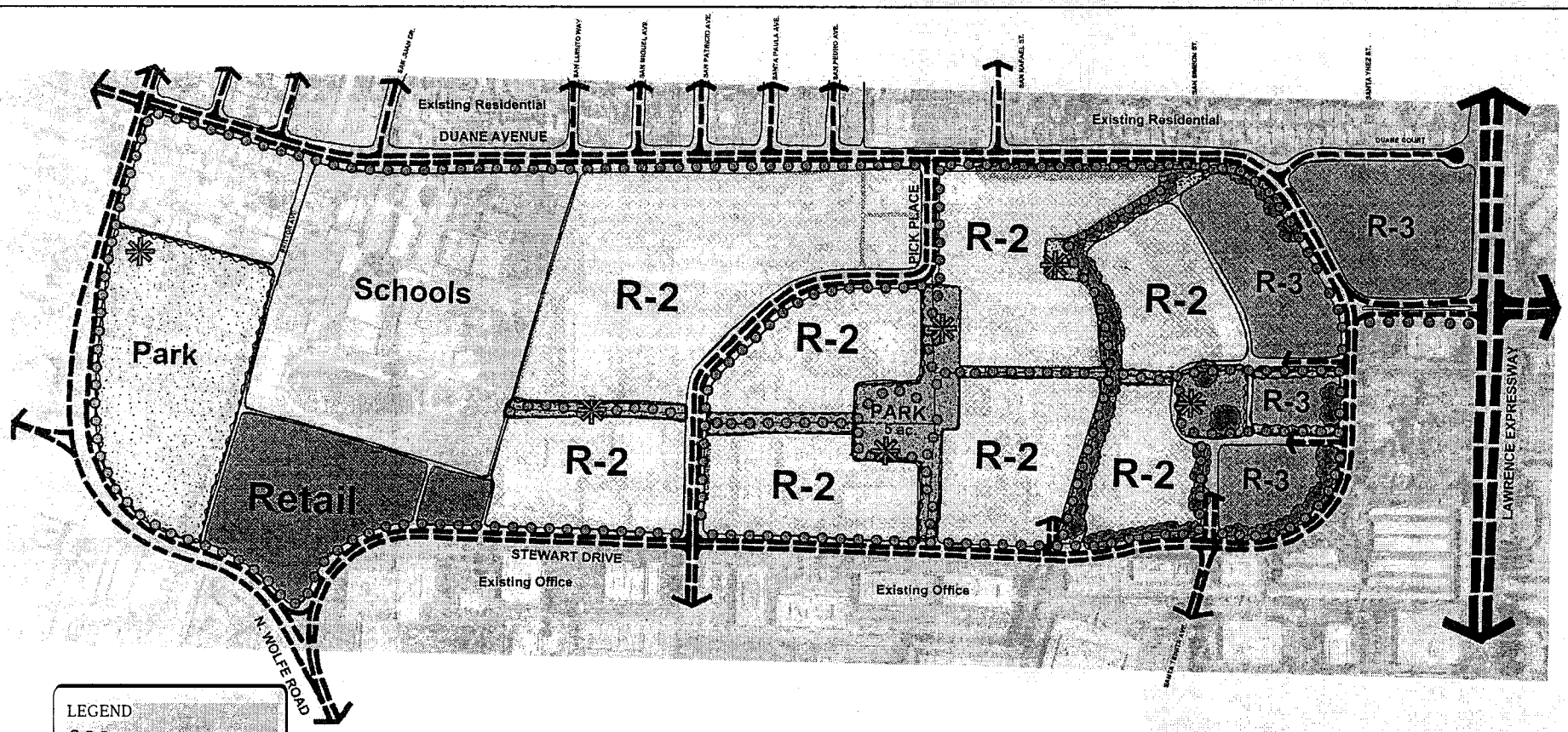
Figure 3
Development Plan
Scenario 1



LEGEND

- Pedestrian Path
- Children's Play Area
- Existing Trees

R-2	10 - 12 du/ac
R-3	13 - 24 du/ac
R-4	25 - 36 du/ac

SCALE IN FEET: 1" = 200'

0 100 200 400 600

Source: Randall Planning and Design, January 2006.

Note: Gray shaded area not part of proposed development.

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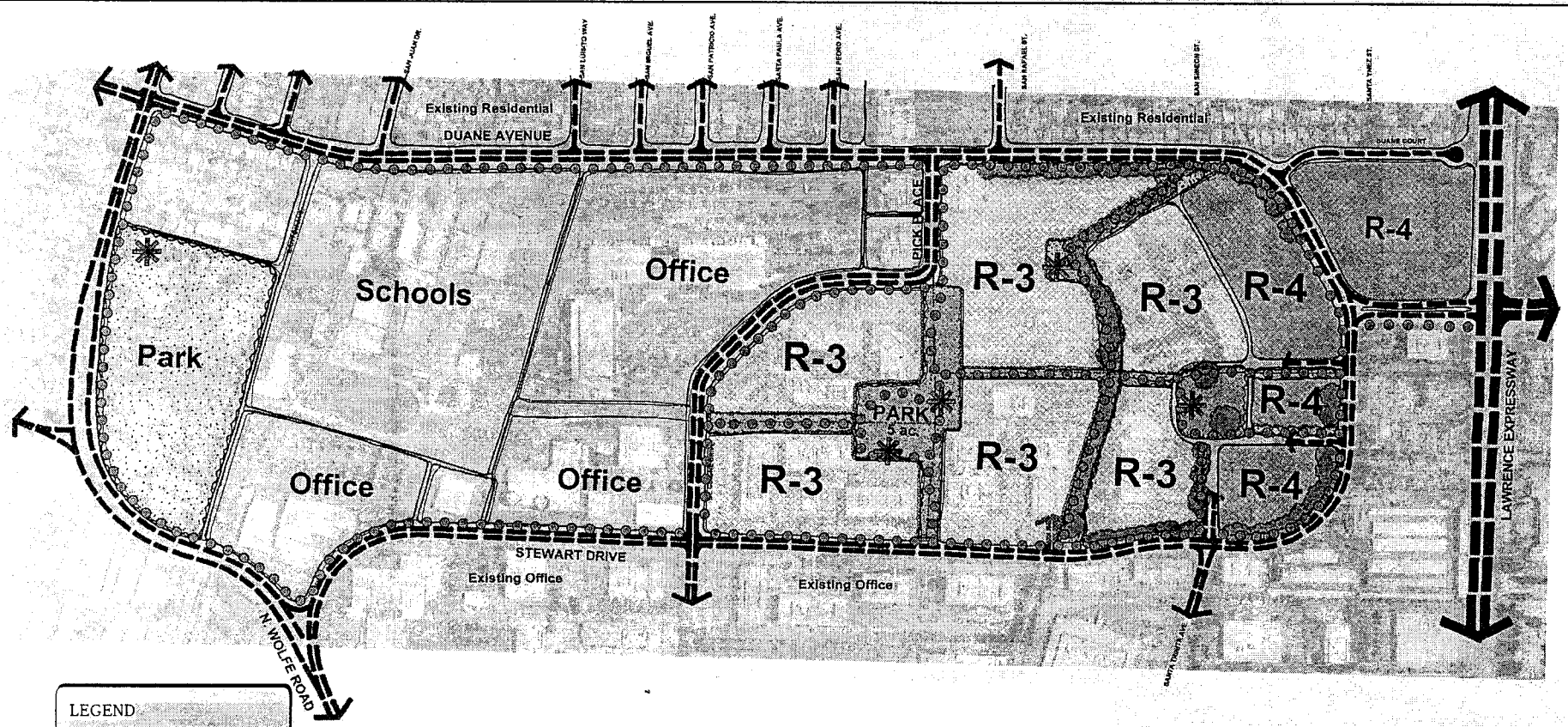

LEGEND

- Pedestrian Path
- Children's Play Area
- Existing Trees

R-2	10 - 12 du/ac
R-3	13 - 24 du/ac
R-4	25 - 36 du/ac

SCALE IN FEET: 1" = 200'

0 100 200 400 600

Source: Randall Planning and Design, January 2006.

Note: Gray shaded area not part of proposed development.

March 2006	Figure 5 Development Plan Scenario 3
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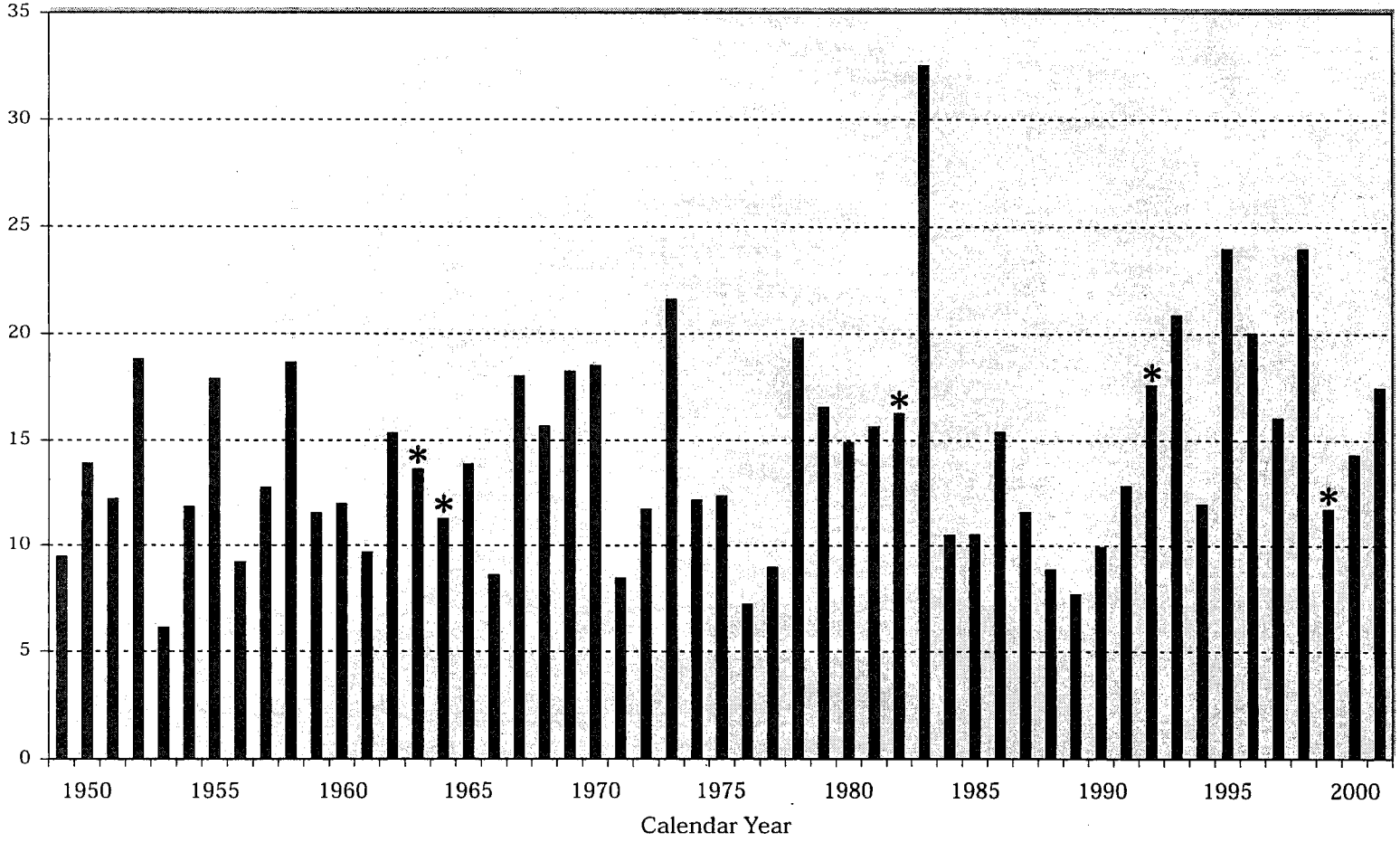

Year	* Missing Month(s)
1963	October, November, December
1964	January
1982	March
1992	August
1999	September, October

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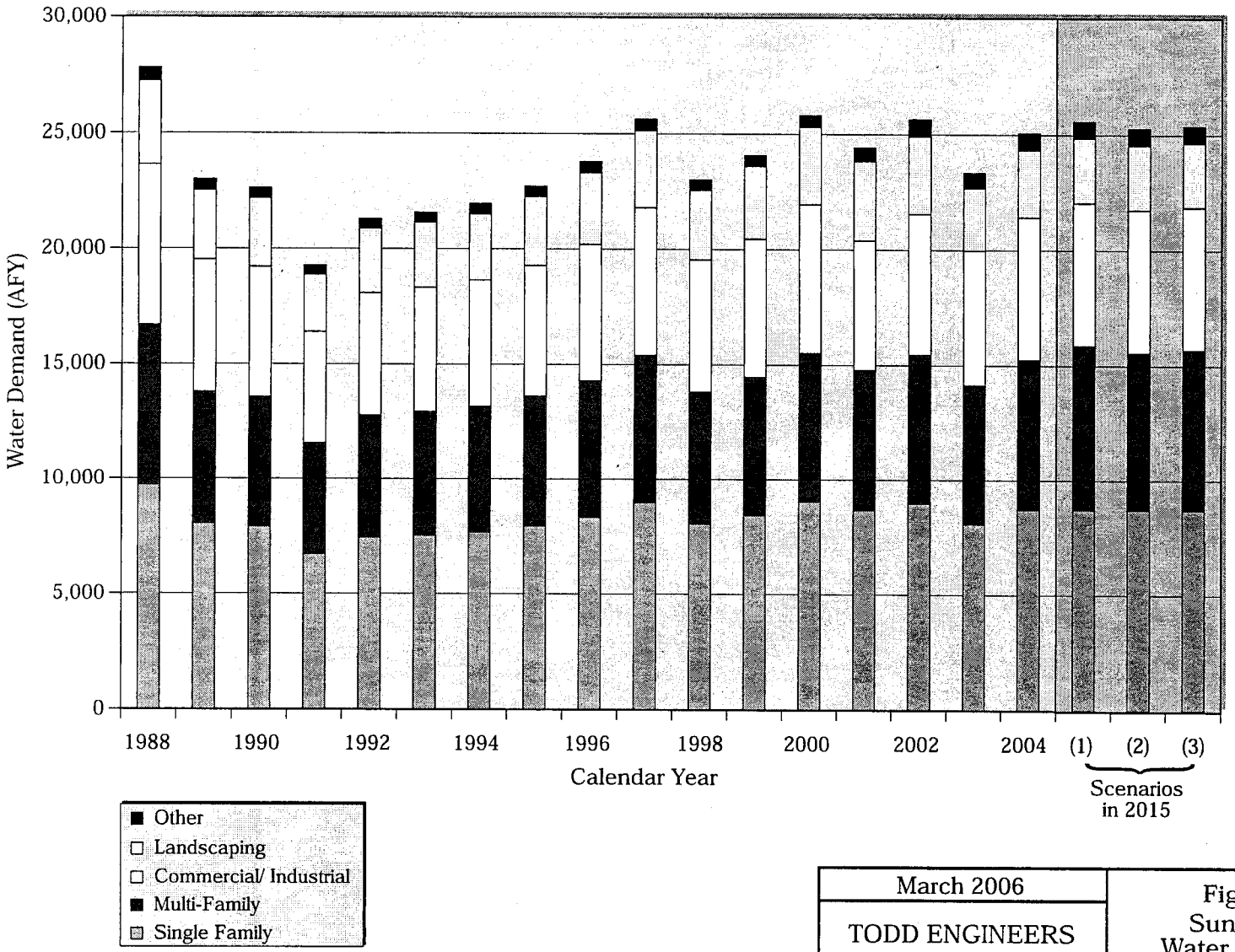
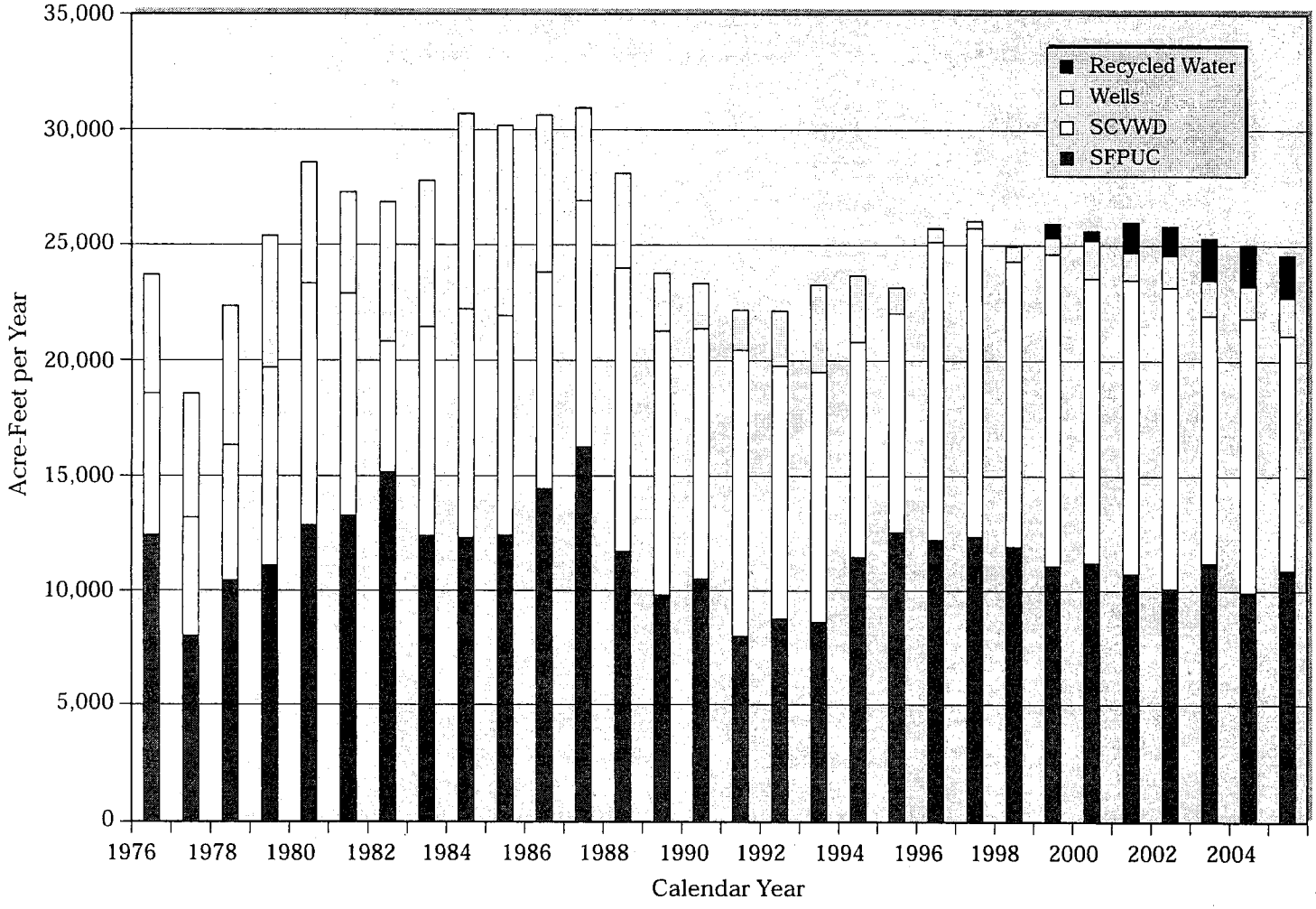
Figure 6
Annual
Precipitation



March 2006 TODD ENGINEERS Emeryville, California	Figure 7 Sunnyvale Water Demand, 1988 - 2015



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